CPC COOPERATIVE PATENT CLASSIFICATION

Y02T CLIMATE CHANGE MITIGATION TECHNOLOGIES RELATED TO TRANSPORTATION

WARNING

Subclass Y02T and its groups are not complete

Guide heading:

Y02T 10/00 Road transport of goods or passengers

Y02T 10/10 . Internal combustion engine [ICE] based vehicles
Y02T 10/12 . . Technologies for the improvement of indicated efficiency of a conventional ICE
Y02T 10/121 . . . Adding non fuel substances to fuel, air or fuel/air mixture
Y02T 10/123 . . . Fuel injection
Y02T 10/125 . . . Combustion chambers and charge mixing enhancing inside the combustion chamber
Y02T 10/126 . . . Treating fuel, air or air/fuel mixture
Y02T 10/128 . . . Methods of operating, e.g. homogeneous charge compression ignition [HCCI], premixed charge compression ignition [PCCI]
Y02T 10/14 . . Technologies for the improvement of mechanical efficiency of a conventional ICE
Y02T 10/142 . . . Methods of operating, e.g. Atkinson cycle, Ericsson
Y02T 10/144 . . . Non naturally aspirated engines, e.g. turbocharging, supercharging
Y02T 10/146 . . . Charge mixing enhancing and kinetic or wave energy of charge outside the combustion chamber, i.e. ICE with external or indirect fuel injection
Y02T 10/148 . . . Downsizing or downspeeding
Y02T 10/16 . . Energy recuperation from low temperature heat sources of the ICE to produce additional power
Y02T 10/163 . . . Turbocompound engines
Y02T 10/166 . . . Waste heat recovering cycles or thermoelectric systems
Y02T 10/17 . . Non-reciprocating piston engines, e.g. rotating motors
Y02T 10/18 . . Varying inlet or exhaust valve operating characteristics
Y02T 10/20 . . Exhaust after-treatment
Y02T 10/22 . . . Three way catalyst technology, i.e. oxidation or reduction at stoichiometric equivalence ratio
Y02T 10/24 . . . Selective Catalytic Reactors for reduction in oxygen rich atmosphere
Y02T 10/26 . . . Thermal conditioning of exhaust after-treatment
Y02T 10/30 . . Use of alternative fuels
Y02T 10/32 . . . Gaseous fuels
Y02T 10/34 . . . Non-gaseous fuels
Y02T 10/36 . . . Multiple fuels, e.g. multi fuel engines

Y02T 10/38	. . .	Non-fossil fuels
Y02T 10/40	. .	Engine management systems
Y02T 10/42	. . .	controlling air supply
Y02T 10/44	. . .	controlling fuel supply
Y02T 10/46	. . .	controlling ignition
Y02T 10/47	. . .	Exhaust feedback
Y02T 10/48	. . .	Switching off the internal combustion engine, e.g. stop and go
Y02T 10/50	. .	Intelligent control systems e.g. conjoint control
Y02T 10/52	. . .	relating to internal combustion engine fuel consumption
Y02T 10/54	. . .	relating to internal combustion engine emissions
Y02T 10/56	. . .	Optimising drivetrain operating point
Y02T 10/60	.	Other road transportation technologies with climate change mitigation effect (not used, see subgroups)
Y02T 10/62	. .	Hybrid vehicles
Y02T 10/6204	. . .	using ICE and mechanical energy storage, e.g. flywheel (mechanical storage units for electromobility in general Y02T 10/7027)
Y02T 10/6208	. . .	using ICE and fluidic energy storage, e.g. pressure accumulator
Y02T 10/6213	. . .	using ICE and electric energy storage, i.e. battery, capacitor (battery or capacitor technology for electromobility in general Y02T 10/7005 , Y02T 10/7022)
Y02T 10/6217	. . . .	of the series type or range extenders
Y02T 10/6221	. . . .	of the parallel type
Y02T 10/6226	. . . . .	Motor-assist type
Y02T 10/623	. . . .	of the series-parallel type
Y02T 10/6234	. . . . .	Series-parallel switching type
Y02T 10/6239	. . . . .	Differential gearing distribution type
Y02T 10/6243	. . . . .	Electrical distribution type
Y02T 10/6247	. . . .	with motor integrated into gearbox
Y02T 10/6252	. . . . .	connected or connectable to input shaft of gearing
Y02T 10/6256	. . . . .	connected or connectable to intermediate shaft of gearing
Y02T 10/626	. . . . .	Motor between output shaft of gearing and driven wheels
Y02T 10/6265	. . . .	Driving a plurality of axles
Y02T 10/6269	. . . .	provided with means for plug-in
Y02T 10/6273	. . .	Combining different types of energy storage
Y02T 10/6278	. . . .	Battery and capacitor
Y02T 10/6282	. . . .	Battery and mechanical or fluidic energy storage
Y02T 10/6286	. . .	Control systems for power distribution between ICE and other motor or motors
Y02T 10/6291	. . . .	Predicting future driving conditions
Y02T 10/6295	. . .	Other types of combustion engine
Y02T 10/64	. .	Electric machine technologies for applications in electromobilty
Y02T 10/641	. . .	characterised by aspects of the electric machine
Y02T 10/642	. . .	Control strategies of electric machines for automotive applications

Y02T 10/643	....	Vector control
Y02T 10/644	....	Control strategies for ac machines other than vector control
Y02T 10/645	....	Control strategies for dc machines
Y02T 10/646	....	Number of electric drive machines
Y02T 10/647	.....	One electric drive machine
Y02T 10/648	.....	Two electric drive machines
Y02T 10/649	.....	More than two electric drive machines
Y02T 10/70	..	Energy storage for electromobility (hydrogen internal combustion engines Y02T 90/42 ; fuel cell powered electric vehicles Y02T 90/34)
Y02T 10/7005	...	Batteries
Y02T 10/7011	....	Lithium ion battery
Y02T 10/7016	....	Lead acid battery
Y02T 10/7022	...	Capacitors, supercapacitors or ultracapacitors
Y02T 10/7027	...	Mechanical energy storage devices
Y02T 10/7033	....	Fly wheels
Y02T 10/7038	...	Energy storage management
Y02T 10/7044	....	Controlling the battery or capacitor state of charge
Y02T 10/705	....	Controlling vehicles with one battery or one capacitor only
Y02T 10/7055	....	Controlling vehicles with more than one battery or more than one capacitor
Y02T 10/7061	.....	the batteries or capacitors being of the same voltage
Y02T 10/7066	.....	the batteries or capacitors being of a different voltage
Y02T 10/7072	...	Electromobility specific charging systems or methods for batteries, ultracapacitors, supercapacitors or double-layer capacitors (efficient charging systems for batteries, ultracapacitors, supercapacitors or double-layer capacitors in road transportation in general Y02T 10/92)
Y02T 10/7077	....	on board the vehicle
Y02T 10/7083	.....	with the energy being of renewable origin
Y02T 10/7088	....	Charging stations
Y02T 10/7094	.....	with the energy being of renewable origin
Y02T 10/72	..	Electric energy management in electromobility
Y02T 10/7208	...	Electric power conversion within the vehicle
Y02T 10/7216	....	DC to DC power conversion
Y02T 10/7225	.....	Using step - up or boost converters
Y02T 10/7233	.....	Using step - down or buck converters
Y02T 10/7241	....	DC to AC or AC to DC power conversion
Y02T 10/725	....	AC to AC power conversion
Y02T 10/7258	...	Optimisation of vehicle performance
Y02T 10/7266	....	Automated control
Y02T 10/7275	....	Desired performance achievement
Y02T 10/7283	....	Optimisation of energy managament
Y02T 10/7291	....	Route optimisation
Y02T 10/76	..	Transmission of mechanical power

Y02T 10/80	.	Technologies aiming to reduce green house gasses emissions common to all road transportation technologies
Y02T 10/82	. .	Tools or systems for aerodynamic design
Y02T 10/84	. .	Data processing systems or methods, management, administration
Y02T 10/86	. .	Optimisation of rolling resistance.
Y02T 10/862	. . .	Tyres, e.g. materials, shape
Y02T 10/865	. . .	Bearings
Y02T 10/867	. . .	Others, e.g. wheel construction
Y02T 10/88	. .	Optimized components or subsystems e.g. lighting, actively controlled glasses
Y02T 10/90	. .	Energy harvesting concepts as power supply for auxiliaries' energy consumption e.g. photovoltaic sun-roof
Y02T 10/92	. .	Energy efficient charging or discharging systems for batteries, ultracapacitors, supercapacitors or double-layer capacitors specially adapted for vehicles

Y02T 30/00 Transportation of goods or passengers via railways

Y02T 30/10	.	Energy recovery technologies concerning the propulsion system in locomotives or motor railcars
Y02T 30/12	. .	In electric locomotives or motor railcars with electric accumulators, e.g. involving regenerative braking
Y02T 30/14	. .	In locomotives or motor railcars with pneumatic accumulators
Y02T 30/16	. .	In locomotives or motor railcars with two or different kinds or types of engine
Y02T 30/18	. .	Specific power storing devices
Y02T 30/30	.	Other technological aspects of railway vehicles
Y02T 30/32	. .	Reducing air resistance by modifying contour
Y02T 30/34	. .	Composite Lightweight materials
Y02T 30/36	. .	Device for using the energy of the movements of the vehicle
Y02T 30/38	. .	Bogie frames comprising parts made from fiber-reinforced matrix material
Y02T 30/40	. .	Applications of solar cells or heat pipes, e.g. on ski-lift cabins or carriages for passengers or goods
Y02T 30/42	. .	concerning heating, ventilating or air conditioning

Y02T 50/00 Aeronautics or air transport

Y02T 50/10	.	Drag reduction
Y02T 50/12	. .	Overall configuration, shape or profile of fuselage or wings
Y02T 50/14	. .	Adaptive structures
Y02T 50/145	. . .	Morphing wings or smart wings
Y02T 50/16	. .	by influencing airflow
Y02T 50/162	. . .	Wing tip vortex reduction
Y02T 50/164	. . . .	Winglets
Y02T 50/166	. . .	by influencing the boundary layer

Y02T 50/168 . . . . actively

Y02T 50/30 . Wing lift efficiency
Y02T 50/32 . . Optimised high lift wing systems
Y02T 50/34 . . Helicopter rotor blades lift efficiency

Y02T 50/40 . Weight reduction
Y02T 50/42 . . Airframe
Y02T 50/43 . . . Materials
Y02T 50/433 . . . . Composites
Y02T 50/436 . . . . Metallic lightweight
Y02T 50/44 . . . Design measures
Y02T 50/46 . . Interior
Y02T 50/47 . . . Materials
Y02T 50/48 . . . Design measures

Y02T 50/50 . On board measures aiming to increase energy efficiency
Y02T 50/52 . . concerning the electrical systems
Y02T 50/53 . . . Energy recovery, conversion or storage systems
Y02T 50/54 . . . Electric actuators or motors
Y02T 50/545 . . . . All electric architecture
Y02T 50/56 . . Thermal management
Y02T 50/57 . . . Reduction of energy losses
Y02T 50/58 . . . Optimization of hot and cold sources on board an aircraft

Y02T 50/60 . Efficient propulsion technologies
Y02T 50/62 . . Electrical
Y02T 50/64 . . Hybrid
Y02T 50/66 . . Propellers
Y02T 50/67 . . Relevant aircraft propulsion technologies
Y02T 50/671 . . . Measures to reduce the propulsor weight
Y02T 50/672 . . . . using composites
Y02T 50/673 . . . Improving the rotor blades aerodynamic
Y02T 50/675 . . . Enabling an increased combustion temperature by cooling
Y02T 50/676 . . . . Blades cooling
Y02T 50/677 . . . Controlling the propulsor to control the emissions
Y02T 50/678 . . . using fuels of non-fossil origin
Y02T 50/69 . . Solar cells as on board power source

Y02T 50/70 . Enabling use of sustainable fuels
Y02T 50/72 . . Synthetic fuels
Y02T 50/74 . . Bio fuels

Y02T 50/80 . Energy efficient operational measures

Y02T 50/82 . . Related to ground operations
Y02T 50/823 . . . Aircraft equipment, e.g. wheel embedded
Y02T 50/826 . . . Ground equipment
Y02T 50/84 . . Related to management of trajectory and mission

Y02T 50/90 . Eco design, i.e. taking into account the full life cycle of the craft including re-use, recyclability and disposal

Y02T 70/00 Maritime or waterways transport

Y02T 70/10 . Measures concerning design or construction of watercraft hulls
Y02T 70/12 . . Improving hydrodynamics of hull
Y02T 70/121 . . . Reducing surface friction
Y02T 70/122 . . . . Air lubrication, air cavity systems
Y02T 70/123 . . . . Hull coatings, e.g. biomimicry
Y02T 70/125 . . . Lower wave resistance
Y02T 70/126 . . . . Bow shape
Y02T 70/127 . . . improving wake pattern
Y02T 70/128 . . . . reducing the interaction between hull and propeller
Y02T 70/14 . . Construction of hull
Y02T 70/143 . . . Materials, e.g. ultra light steels, composites
Y02T 70/146 . . . Energy efficient measures related to fabrication or assembly of hull

Y02T 70/30 . Measures at the maintenance or repair stage specially aiming at green house gasses emissions reduction
Y02T 70/32 . . Surface or tank cleaning and treatment operations
Y02T 70/34 . . Improved operation of fossil fuel transfer, e.g. ship-to-ship oil or gas transfer
Y02T 70/36 . . Handling waste

Y02T 70/50 . Measures to reduce greenhouse gas emissions related to the propulsion system
Y02T 70/52 . . Propulsion power plant
Y02T 70/5209 . . . Relating to type of fuel
Y02T 70/5218 . . . . Less carbon-intensive fuels, e.g. natural gas, biofuels
Y02T 70/5227 . . . . Non-conventional fuels, e.g. nuclear
Y02T 70/5236 . . . Renewable or hybrid-electric solutions
Y02T 70/5245 . . . . using solar generated electricity, e.g. photovoltaics
Y02T 70/5254 . . . . using wind motor to generate electricity
Y02T 70/5263 . . . Other measures to increase efficiency of the power plant
Y02T 70/5272 . . . . Engine monitoring and control
Y02T 70/5281 . . . . Waste heat recovery
Y02T 70/529 . . . . Reducing auxiliary power
Y02T 70/54 . . Propeller
Y02T 70/542 . . . Improved propeller design
Y02T 70/545 . . . Recovery of rotational energy

Y02T 70/547	. . .	Wake equalizing arrangements
Y02T 70/56	. .	Jets
Y02T 70/58	. .	Propulsion by direct use of wind
Y02T 70/583	. . .	Energy efficient technologies involving sails
Y02T 70/586	. . .	Kites
Y02T 70/59	. .	Other propulsion concepts for reducing greenhouse gas emissions, e.g. wave-powered
Y02T 70/70	.	Technologies for a more efficient operation of the waterborne vessel not otherwise provided for
Y02T 70/72	. .	Related to heating, ventilation, air conditioning, or refrigeration systems
Y02T 70/74	. .	Integrating maritime voyage control
Y02T 70/742	. . .	Speed reduction
Y02T 70/745	. . .	Weather routing
Y02T 70/747	. . .	Course optimization
Y02T 70/80	.	Measures concerning recycling, retrofitting or dismantling of waterborne vessels
Y02T 70/90	.	Port equipment or systems reducing GHG emissions
Y02T 90/00	**Enabling technologies or technologies with a potential or indirect contribution to GHG emissions mitigation**	
Y02T 90/10	.	Technologies related to electric vehicle charging (not used, see subgroups)
Y02T 90/12	. .	Electric charging stations
Y02T 90/121	. . .	by conductive energy transmission
Y02T 90/122	. . .	by inductive energy transmission
Y02T 90/124	. . .	by exchange of energy storage elements
Y02T 90/125	. . .	Alignment between the vehicle and the charging station
Y02T 90/127	. . .	Converters or inverters for charging
Y02T 90/128	. . .	Energy exchange control or determination
Y02T 90/14	. .	Plug-in electric vehicles
Y02T 90/16	. .	Information or communication technologies improving the operation of electric vehicles
Y02T 90/161	. . .	Navigation
Y02T 90/162	. . . .	Position determination
Y02T 90/163	. . .	Information or communication technologies for charging station selection
Y02T 90/164	. . . .	Charging station suitability
Y02T 90/165	. . . .	Charging station location
Y02T 90/166	. . . .	Charging station availability
Y02T 90/167	. . .	Systems integrating technologies related to power network operation and communication or information technologies for supporting the interoperability of electric or hybrid vehicles, i.e. smartgrids as interface for battery charging of electric and hybrid vehicles (power aggregation of HEV or EV Y02E 60/721) (not used, see subgroups)

NOTE

Documents tagged under Y02T 90/167 are concurrently tagged also under Y04S 30/10

Y02T 90/168 .... Remote or cooperative charging operation

Y02T 90/169 .... Aspects supporting the interoperability of electric or hybrid vehicles, e.g. recognition, authentication, identification or billing

Y02T 90/30 . Application of fuel cell technology to transportation (not used, see subgroups)

Y02T 90/32 .. Fuel cells specially adapted to transport applications, e.g. automobile, bus, ship

Y02T 90/34 .. Fuel cell powered electric vehicles [FCEV]

Y02T 90/36 .. Fuel cells as on-board power source in aeronautics

Y02T 90/38 .. Fuel cells as on-board power source in waterborne transportation

Y02T 90/40 . Application of hydrogen technology to transportation (Y02T 90/30 takes precedence) (not used, see subgroups)

Y02T 90/42 .. Hydrogen as fuel for road transportation

Y02T 90/44 .. Hydrogen as fuel in aeronautics

Y02T 90/46 .. Hydrogen as fuel in waterborne transportation